

## IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of

**William McKee Doane  
and Steven William Doane**

Confirmation No. 5971

Application No. 10/762,956

Filed: January 21, 2004

For: **METHODS OF FORMING  
SUPERABSORBENT POLYMER  
PRODUCTS FOR USE IN  
AGRICULTURE**

**DRAFT**

Group Art Unit: 1711

Examiner: Thao T. Tran

Date: July 10, 2005

37 C.F.R. § 1.132 DECLARATION OF DR. WILLIAM M. DOANE

TO THE COMMISSIONER FOR PATENTS:

I, William M. Doane, declare as follows:

1. I am an inventor named in U.S. Patent No. 4,134,863 entitled **HIGHLY ABSORBENT GRAFT COPOLYMERS OF POLYHYDROXY POLYMERS, ACRYLONITRILE, AND ACRYLIC COMONOMERS**.
2. My credentials are described in detail in my February 22, 2005 Declaration under 37 C.F.R. § 1.132.
3. I submit this declaration to explain certain teachings of U.S. Patent No. 4,134,863 as it relates to the above-identified patent application.
4. U.S. Patent No. 4,134,863 teaches the formation of an absorbent composition in the form of a film.
5. U.S. Patent No. 4,134,863 does not describe or teach the formation of granules of superabsorbent polymer product sized for use in agricultural applications.
6. To provide a visual demonstration that the absorbent composition described in U.S. Patent No. 4,134,863 forms a film rather than granules, I and one of my co-inventors, Dr. George F. Fanta, prepared the absorbent composition using the process described in

Examples 25, 27, 29, 31, and 33 of U.S. Patent No. 4,134,863. We had photographs of the process and the resulting absorbent composition taken. I submit these photographs as Exhibits A-G. I also submit as Exhibits H-J sample of various forms of differing absorbent compositions.

7. Exhibit A is a color photograph showing Dr. Fanta preparing to add a doughy mass of saponificate to a drum dryer.
8. Exhibit B is a color photograph showing Dr. Fanta adding the doughy mass of saponificate to the drum dryer.
9. Exhibit C is a color photograph showing the saponificate being processed by the drum dryer.
10. Exhibits D and E are color photographs showing Dr. Fanta removing a film of absorbent composition from the drum dryer.
11. Exhibit F is a color photograph showing Dr. Fanta holding the film of absorbent composition that he removed from the drum dryer.
12. Exhibit G is a color photograph showing Dr. Fanta cutting a sample of the film of absorbent composition that he removed from the drum dryer.
13. Exhibit H is a sample of the film shown in Exhibit G.
14. Exhibit I is a sample of the Exhibit H film after it has been Wiley-milled through a 120-mesh screen as described in Example 1 of U.S. Patent No. 4,134,863 (col. 8, lines 14-35).
15. For comparison purposes, I submit Exhibit J, which is a sample of granules of superabsorbent polymer product made as described Example 1 of the above-identified patent application.
16. The absorbent compositions provided as Exhibits H and I are differently sized films. Exhibit H is a large piece of film, whereas Exhibit I includes many small pieces of film. In contrast, the sample of superabsorbent polymer product provided as Exhibit J is in the form of many small granules.
17. Wiley-milling the film of absorbent composition provided as Exhibit H will not produce a granular form of the absorbent composition.
18. It is, in fact, impossible to form granules of starch graft copolymer by Wiley-milling films of absorbent composition. A Wiley mill includes several razor-sharp blades that extend from a hollow cylinder that rotates around a central shaft. U.S. Patent No. 4,134,863 describes feeding dried starch graft copolymer films, similar to that provided as Exhibit H, into a Wiley mill such that they come into contact with the razor-sharp blades.

The blades make contact with the film and reduce the size of the film. Reduction in film size does not result in the formation of granules of absorbent composition. Reduction in film size results in only the formation of smaller-sized films.

19. The Wiley-milled films of absorbent composition described in U.S. Patent No. 4,134,863 were intended to be used in diapers. Support for this assertion can be found in U.S. Patent No. 4,134,863 at col. 5, lines 41 and 55; col. 6, lines 33 and 62; and in Examples 2-23, 25, 27, 29, 31, 33, and 41, all of which describe the ability of the absorbent composition to absorb urine. Films of absorbent composition work exceedingly well in diapers.

20. Although films of absorbent composition work exceedingly well in diapers, they cannot effectively be used in large-scale agriculture. As I stated in my February 22, 2005 Declaration under 37 C.F.R. § 1.132, "[t]he films [described in U.S. Patent No. 4,134,863] cannot be used in agricultural applications, because they (1) cannot be applied with granular fertilizers, granular pesticides, or other granular agricultural additives; (2) cannot be applied using a granule applicator; and (3) are so brittle that transport and application of the films to a growth substrate causes them to collide and break apart to form a powder that is blown away by any wind present during their application to a growth substrate." Further, even if the films do not break apart into powders, the low density of the films often results in their blowing away in wind or air current present during their application to soil.

21. U.S. Patent No. 4,134,863 states that "films or particles of these absorbent compositions retain their integrity as they swell and imbibe water" (col. 7, lines 50-51). Also, U.S. Patent No. 4,134,863 refers to "[s]wollen polymer particles" (col. 8, line 41).

22. The references to "particles" in col. 7, line 50 and col. 8, line 41 of U.S. Patent No. 4,134,863 do not describe granules of absorbent composition. Rather, the references to "particles" describe the smaller-sized particles of film (see Exhibit I) that are formed by Wiley-milling the larger-sized film (see Exhibit H).

23. For these reasons, U.S. Patent No. 4,134,863 does not teach the formation of granules of superabsorbent polymer product suitable for use in agricultural applications.

24. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true, and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the

United States Code and that such willful false statements may jeopardize the validity of the above-identified application or any patent issued thereon.

Date: \_\_\_\_\_

**DRAFT**

Dr. William M. Doane